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Benefits of Life-Long Education

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Benefits of Life-Long Education. *The influence of life-long education on person's cognitive functioning is considered in the article. Flexibility of cognitive control was used as a marker for cognitive integrity. 116 respondents aged 56-84 participated in the research. Participants have been learning from 8 to 36 years in their lives. Some of them have even four different educations. Statistically significant correlation between indices of cognitive flexibility and years of education has been obtained in the research. The conclusion that formal education with considerable years of education promotes cognitive well-being has been drawn. Life-long education makes it easy to adapt to challenges of modern world. It allows us to save mind's clarity and flexibility thus ensuring successful aging and cognitive integrity.*

Keywords: *life-long education, life-long learning, person's cognitive well-being, cognitive flexibility, cognitive health.*

Introduction. Globalization and changing conditions of economic development, the emergence of new professions and the dying out of old, traditional ones, the penetration of modern technology in everyday life lead an individual to the need not only to update their skills throughout adulthood, but also to acquire new knowledge and skills. All this leads to the fact that in today's world, an individual's willingness and ability to learn and to adapt to the need for continuous learning and the acquisition of new skills during adulthood is becoming increasingly important.

The concept of lifelong learning began to be used as an academic term in the 1960s. By the mid-1970s, the idea of lifelong learning formed the basis for educational reforms in many countries. In Russia, the idea of lifelong learning has been enshrined in the Federal Law of the Russian Federation "On Higher and Postgraduate Professional Education" (Federal law, 1996). According to the concept of lifelong learning, education should become a part of life activity, an ongoing process of acquiring knowledge throughout life. Learning should start from pre-school age and continue uninterrupted, including adulthood. The continuity of the educational process implies learning not only in specialized institutions, but also in additional education.

The modern approach to lifelong learning includes several areas: lifelong learning education, adult education and continuing professional education (continuing vocational education and training) (Boyko et al., 2014). Lifelong learning is not only the continuous development of skills and knowledge throughout a person's life. Lifelong learning promotes social inclusion and personal development. Lifelong learning encompasses the full range of different forms of learning: formal, non-formal and informal.

Formal learning takes place in an organized and structured context (school, university, continuing education courses, etc.). As a rule, this form of learning and the qualification obtained is confirmed by an official document (diploma, certificate). Informal learning also implies that as a result of it a person acquires new knowledge, skills, and proficiency. For example, the vocational skills a person acquires at work may be referred to as informal learning. Informal learning takes place in the course of daily life and is connected to family, work and leisure. It often occurs quite casually and without a specific educational objective. Thus, education can take different forms from the traditional ones associated with formal learning.

Lifelong learning is one of the main ways of ensuring not only a high level of individual employability, but also the best way of maintaining cognitive, social and emotional health of an individual. Individuals with more years of training show higher levels of psychological well-being and are less likely to be involved in criminal acts (Dunn, 2003).

The **objective** of this study was to examine the impact of formal schooling duration on person's cognitive health in late adulthood.

Method. A total of 116 people aged between 56 and 84 years, with a mean age of 64 years and a standard deviation of 8.5 years, participated in the study. At the time of the survey, none of them were working; all were retired either because of age or because of length of service. This point was important for the formation of the sample, as it has been shown in our previous studies that work activity in late adulthood is a factor that increases subjective psychological well-being and cognitive retention (Belovol et al., 2016; Belovol et al., 2015; Belovol et al., 2016; Boyko et al., 2014).

In terms of formal education, the respondents included people who had completed only 8th grade and had not studied anywhere else, but who had mastered various professional skills during their lives. The respondents also included candidates and doctors of science. Respondents who had received several formal higher education degrees during their lifetime also participated in the study. Information about education and duration of study in the study was obtained on the basis of questionnaire data, which was asked to be supported by relevant documents. The main variable of interest to the researchers was the number of years the respondents had studied during their lifetime.

To study cognitive retention, the study investigated cognitive flexibility as one of the indicators of cognitive retention. For this purpose, The Stroop Color and Word Test (SCWT) was used. The SCWT is widely used to measure the ability to inhibit cognitive interference and other cognitive functions such as attention, processing speed, cognitive flexibility (Jensen and Rohwer, 1966). Thus, it may be possible to use the SCWT to measure multiple cognitive functions (Scarpina and Tagini, 2017).

Subjects are required to read three different tables as fast as possible.

The first table (W-table) is a blank with words denoting the names of four colours (red, blue, yellow, green). All the words are written in one colour (black) and grouped randomly in a 10x10 matrix. Each word occurs 10 times.

The second table (C-table) is a blank with four color patches (red, blue, yellow, green) drawn on it. The figures are grouped randomly in a

10x10 matrix. Each colour occurs 25 times.

The third table (CW table) is a blank with the names of the same four colours written on it, with the ink colour and the verbal name of the colour not being the same. For example, the word "yellow" is written in red ink, the word "blue" in green, etc. The coloured words are grouped randomly in a 10x10 matrix. An example of the stimulus material is shown in Figure 1.

The test person was given the following instruction:

For W - table: "In front of you is a blank with names of colours written on it. Here and in the following tasks four colours are used: red, blue, yellow, green. You must read these words out loud as quickly as possible, one by one, along the lines from left to right, from the first to the last."

For C - table: "Here is a blank with different coloured crosses. You have to say the colour of the figure as quickly as possible, one by one, on the lines from left to right, from first to last."

For CW - table: "In front of you is a blank with names of colours. And the names of the colours do not correspond to the colour of the ink. For example, look (take an example from the serial blank): the word "blue" is written in green ink, the word "red" in yellow, etc. You should name the colour of the ink with which the words are written as quickly as possible and without mistakes."

The researcher records the time taken to complete each individual task. An indicator of cognitive flexibility is used as an indicator of the difference between the time taken to complete the CW table and the C table. This index is called the interference index and describes the rigidity/flexibility of cognitive control. The greater the difference, the greater the interference effect and therefore the more rigid cognitive control is.

Table 1 **RED BLUE YELLOW GREEN**

Table 2 **XXXX XXXX XXXX XXXX**

Table 3 **RED BLUE YELLOW GREEN**

The task is to name the color of the word

Figure 1. Example of Stroop Color and Word Test stimulus material

Results. So, 116 people between the ages of 56 and 84 participated in the study. Each of them had spent between 8 and 36 years in the formal education system. Some respondents had only completed 8th grade at the time (it should be remembered that all respondents received their education in the Soviet educational system and the timing was somewhat different from today). Some respondents graduated from schools, institutes or universities, studied in postgraduate and doctoral studies, some of them changed their field of activity or interests after receiving higher education and received other higher education. Among the respondents, there were those who had received up to four different higher education degrees during their lifetime. The distribution of respondents by duration of study is shown in Figure 2.

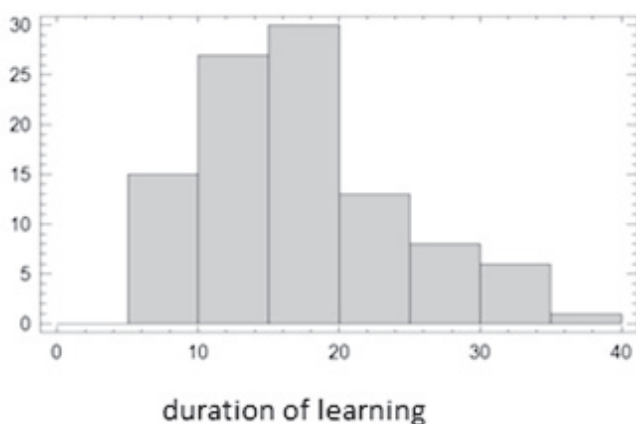


Figure 2. Distribution of respondents by duration of study

The histogram in Figure 2 reflects the fact that the minimum duration of education is 8 years (compulsory 8-year education). The maximum length of study is 36 years. There were seven such respondents. Overall, the average number of years of schooling is 17.9, with a standard deviation of 7 years.

Regarding the indicator of cognitive flexibility, the distribution of this indicator is shown in Figure 3.

The distribution of the index in Figure 3 shows a right-hand asymmetry, which indicates that there is not a very large number of completely rigid respondents in the sample. The main part of the respondents demonstrated a rather high level of flexibility, while a part

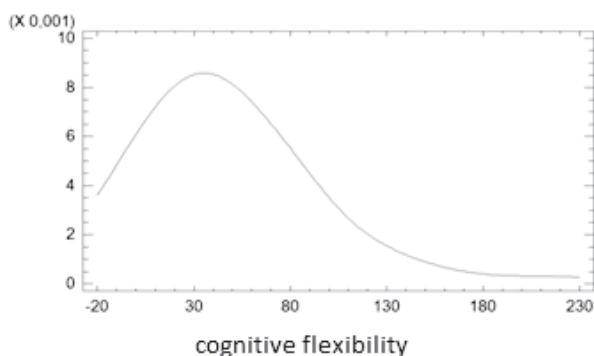


Figure 3. Distribution of the Flexibility-Rigidity Index of Cognitive Control

of the respondents revealed a very high level of cognitive flexibility (36 and 27, respectively).

The results of correlation analysis between the variables are presented in Table 1.

Table 1.
Results of correlation analysis

Variables	Age	Duration of learning	Flexibility-Rigidity
Age	1		
Duration of learning	-0,2615	1	
Flexibility-Rigidity	0,2604	<i>-0,9778*</i>	1

** Significant correlations are highlighted in italic, $\alpha < 0.01$*

The analysis of correlation table shows that there is no statistically significant relationship between the age of respondents and the duration of learning, or between age and the flexibility of cognitive control. However, there is a statistically significant relationship between the duration of learning and the flexibility of cognitive control.

In order to clarify the nature of the relationship between the duration of learning and the flexibility of cognitive control, a regression model was built, which is shown in Figure 4.

The graph of the proposed model reflects the non-linear nature of changes in the studied variables. The model suggests that cognitive rigidity is pronounced for those who have spent only a few years (up to 10 years) in formal education. As the duration of learning increases, the

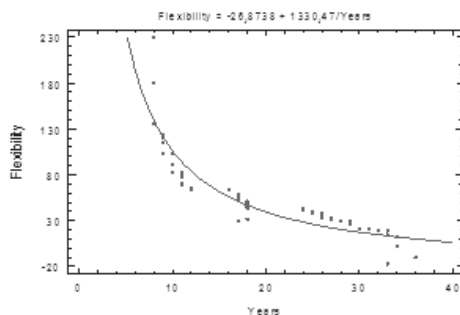


Figure 4. Regression model of the relationship between years of schooling and Flexibility and Rigidity of Cognitive Control (Flexibility).

rigidity of cognitive control decreases and it becomes more flexible. After 18 years of study, cognitive control remains flexible, with no statistically significant trend for further change.

The validity of the above conclusion is confirmed by the parameters of the regression model. The equation of the model is presented below:

$$\text{Flexibility-Rigidity} = -26.8738 + 1330.47/\text{learning duration}$$

The proposed model explains 82.4% of the variance of the variables (coefficient of determination), indicating the adequacy of the model to the available data. The significance values of the model (Fisher's F-criterion and model significance level -*p-value*) reflect the presence of a statistically significant relationship between the variables ($F=240.16$, at $p\text{-value}=0.00034$).

Discussion. Thus, the conducted study showed that there is no relationship between age of respondents and duration of learning, between age and flexibility of cognitive control. However, there is a statistically significant relationship between duration of learning and flexibility of cognitive control. It was revealed that a long formal education - lifelong learning - contributes to maintaining flexibility of thinking. Therefore, if the question arises, "Why do we need lifelong learning?" there may be a very simple answer. Long-term, continuing education, not only allows easy adaptation to the constantly and rapidly changing socio-economic conditions of life. It allows a person to maintain clarity and flexibility in own thinking, thereby ensuring a smooth, successful ageing, with full cognitive function intact.

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Transliteration of References:

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Abstracts

ОЛЕНА БЕЛОВОЛ, ЗЛАТА БОЙКО, ОЛЕНА ШУРУПОВА. **Перепади безперервної освіти.** У статті розглянуто вплив безперервної освіти на когнітивну функцію людини. Гнучкість когнітивного контролю була використана як маркер когнітивної цілісності. У дослідженні взяло участь 116 респондентів у віці 56-84 років. Учасники навчаються у своєму житті від 8 до 36 років. Деякі з них мають навіть чотири різні освіти. У дослідженні отримано статистично значущу кореляцію між показниками когнітивної гнучкості та роками навчання. Зроблено висновок, що формальна освіта зі значними роками навчання сприяє когнітивному благополуччю. Навчання протягом усього життя дозволяє легко адаптуватися до викликів сучасного світу. Це дозволяє нам зберегти ясність та гнучкість розуму, забезпечуючи успішне старіння та пізнавальну цілісність.

Ключові слова: освіта протягом усього життя, навчання протягом усього життя, когнітивний добробут людини, когнітивна гнучкість, когнітивне здоров'я.

ЕЛЕНА БЕЛОВОЛ, ЗЛАТА БОЙКО, ЕЛЕНА ШУРУПОВА. **Преимущества непрерывного образования.** В статье рассматривается влияние непрерывного образования на когнитивное функционирование человека. Гибкость когнитивного контроля использовалась в качестве маркера когнитивной целостности. В исследовании приняли участие 116 респондентов в возрасте 56-84 лет. Участники учатся от 8 до 36 лет своей жизни. Некоторые из них имеют даже четыре разных образования. В исследовании получена статистически значимая корреляция между показателями ког-

нитивной гибкости и продолжительностью обучения. Был сделан вывод о том, что формальное образование со значительными годами обучения способствует когнитивному благополучию. Непрерывное образование позволяет легко адаптироваться к вызовам современного мира. Это позволяет нам сохранять ясность и гибкость ума, тем самым обеспечивая успешное старение и когнитивную целостность. **Ключевые слова:** непрерывное образование, непрерывное обучение, когнитивное благополучие человека, когнитивная гибкость, когнитивное здоровье.

JELENA BIELOWOŁ, ZŁATA BOJKO, JELENA SZURUPOWA. **Zalety kształcenia ustawicznego.** W artykule rozważa się wpływ kształcenia ustawicznego na funkcjonowanie poznawcze człowieka. Elastyczność kontroli poznawczej została wykorzystana jako wskaźnik integralności poznawczej. W badaniu wzięło udział 116 respondentów w wieku 56-84 lata. Uczestnicy uczą się od 8 do 36 lat swojego życia. Niektórzy z nich mają nawet cztery różne wykształcenia. Badanie wykazało statystycznie istotną korelację między wskaźnikami elastyczności poznawczej a czasem trwania nauki. Wyciągnięto wniosek, że formalna edukacja ze znacznymi latami nauki przyczynia się do dobrostanu poznawczego. Kształcenie ustawiczne ułatwia dostosowanie się do wyzwań współczesnego świata. Pozwala nam to zachować jasność i elastyczność umysłu, zapewniając w ten sposób pomyślne starzenie się i integralność poznawczą.

Słowa kluczowe: kształcenie ustawiczne, edukacja ustawiczna, dobrostan poznawczy człowieka, elastyczność poznawcza, zdrowie poznawcze.